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their being consumed on the spot. Some of the timber might be valuable for turnery and small ornamental work, for it is very hard and close-grained, but for all domestic and field purposes wood will have to be imported, especially for the coast settlements—if any.

On the sandstone ranges there are no indications of mineral deposits, but at the base of the hills and in the lower valleys, among the basalt and trap, there are evident signs of much metallic accumulation. Our time did not permit us to make a close examination; nor do I think the knowledge possessed by any of our party was sufficient to render the time profitably employed which was devoted to mineral researches. I have mentioned one spot as offering a prospect of gold-discovery, and also alluded to the specimen of copper-ore brought from the Glenelg. I may likewise state that there was an abundance of iron ores, some of them very pretty specimens, but otherwise of no value in a new country.

The health of every member of the party, excepting Mr. Cowle, who had an attack of incipient fever for two or three days, was excellent. Not only did cuts and sores, brought with us from Camden Harbour, rapidly heal, but any damage received en route from stone or wood, also healed in the course of a few days. Men and horses both looked as well on their return as when they started. Even the horses' legs looked healthy, considering the battering they had received. With fine weather, good water, the absence of all privation, or even annoyance, except the mosquitoes, a short trip, and good health, it is no wonder that we were all pleased with our journey. For my part I have seldom passed a more enjoyable time than that which I spent during our wanderings among the sandstones.

XVI.—*Marine Survey of the Northern Territory of South Australia.* By Mr. F. HOWARD, Master R.N., to the Governor of South Australia.

(Communicated by F. S. DUTTON, Esq., F.R.G.S.)

On the 13th of May, having embarked the Government Resident in the surveying schooner *Beatrice*, we proceeded to ascend the Adelaide River, it being the intention of Colonel Finnis to explore the upper part. We arrived at an anchorage about 6 sea miles above the farthest point reached by the *Beatrice* last year on the 17th.

The same evening we were visited by a party of natives, who came again the next morning; but on this occasion they were not

allowed on board. I did not encourage their visits, as the river here is very narrow, and the vessel was moored with warps to the shore on both sides, and we had already seen something of their pilfering habits. They belonged to the same tribe we had met before, and with whom the affray at the first camp had occurred. These natives having been sent away, we saw no more of them during this trip.

On the 19th, both boats left to explore the upper part of the river, the Government Resident going in Mr. Guy's boat. After proceeding about 15 sea miles above our anchorage, we camped for the night. As I had to return to the vessel on the following morning, I pulled up a mile or two farther, the river keeping a depth of 12 feet, but getting very narrow—not over 20 yards, and being almost blocked up with snags.

We obtained a good latitude position at our camping-place, there being three observers, and on the following morning I returned to the vessel. Mr. Guy and the Government Resident proceeded towards the head of the river, but were only able to get about 3 sea miles above our camp in their boat, to a place a little way beyond where the river forked. They then followed its winding course on foot 2 miles further south to lat. $12^{\circ} 56' 15''$ s. At this spot the river had dwindled to a running brook 4 or 5 yards wide, with deep pools here and there. The country round was a level open grassy forest of gum, scrub, and paperbark-trees, the banks of the stream being lined with tall bamboos. The river would be navigable for a vessel drawing 10 feet, and about 100 feet long, about 3 sea miles above our May anchorage, when she would be stopped by the first bar of rocks, which are nearly dry at low water. Beyond this the white-stemmed paperbark-trees make their appearance, and get more numerous as the river is ascended, until in the long s.e. reaches, near the upper end, they are the prevailing feature of the banks, and make the river very snaggy. In May the water was slightly muddy at the ship and very good, but a few miles higher it was quite clear. In ascending the river, and rounding the different reaches, the appearance of high woody land at the end of nearly every reach was a great contrast to the dead flat of the lower part of the river.

On the 24th of May I visited a part of the Daly Range, about a mile north of Fred's Pass. The view of the country from it was splendid, the grass in the plains being yet quite green, and even where lately burnt off springing up again. The hill we were on had been burnt only a day or two previously, so that it had a most barren appearance, being composed entirely of masses of white flinty sandstone, which appeared harder than granite. All the hills on this range seemed rocky or stony. The summit was thickly clothed with stunted timber of various kinds and variety

of foliage; on looking to the south-westward, over the range, we saw that the country continued hilly and thickly wooded as far as the eye could see. To the eastward stretched an immense plain dotted over with lines and groves of trees marking the course of some creek or the river itself—no part of the water of which could be seen.

On the 25th of May, a small party of natives—one man and four boys—came down on the east bank of the river. They belonged to a tribe we had not seen before. The man, after some time, ventured on board, crawling along one of the stern warps, and Mr. Guy succeeded in getting a photograph of him. This party seemed to understand bartering better than those farther north.

We weighed the same afternoon, and arrived off Escape Cliff on the 28th of May. The same morning (28th), we had an interview with a large body of natives, who mounted in the tall mangroves to view the schooner as she lay at anchor waiting for the ebb stream to take her out of the river. Two only swam off to the vessel, and were afterwards landed in the boat; they had been on board before, last year.

The Government Resident not being ready to proceed to the Victoria and coast south-west of Adam Bay for a month, I thought this a good opportunity to visit the Gulf of Carpentaria, to carry out orders, and accordingly sailed on the 5th of June.

The wind being strong from the eastward and south-eastward, we had to work to windward along the whole of the north coast of *Ärnheim's Land*, and down the Gulf of Carpentaria to Limmen's Bight—this made it a long voyage. I had expected to make the passage in ten days, but such was the strength and steadiness of the wind and current against us, that we did not arrive off Beatrice Inlet, in the Limmen Bight, until the 20th of June.

We sighted Port Essington and ran along the coast, getting a view of Port Bremer and Raffles Bay. Port Essington appeared a dangerous place to approach, Vashon Head and Port Smith being so much alike; and on our return passage, we nearly ran on shore attempting to run in after dark, having, as we thought, made out the entrance plainly at sunset. The land eastward of Port Essington gradually rises, and seems to improve about Raffles Bay.

The wind being very strong from E.S.E., we tried to make a short cut by going through Bowen Straits and crossing Mount Morris Bay, but after working through all day, we found the south end entirely blocked up with shoals, and had to anchor off Croker Island for the night. We had a good view of the west side of Croker Island, which appeared to be rather stony and mostly covered with scrub; towards its south end it appeared to

be much higher than the mainland. The Raffles Bay side of Bowen Straits was densely wooded, without a clear spot, with good-sized trees, mostly paperbark and white-gum. We had a visit from three natives who came off from Croker Island in a small sampan, a boat of Malay build. We hove to for them, as it was blowing strong. On coming alongside, one of them held up a fine large fish, saying "Commander" plainly enough, and on my making my appearance he presented it at once. This is the first and only case I have ever seen of a North Australian native making a present. These people had iron spear-headed fishing-spears in their boat, ate biscuit and drank coffee eagerly, and appreciated tobacco and cigars. I did not hear them make use of any English words, except in repeating them after our men; but they kept crying out several Malay expressions, apparently without knowing their meaning. They remained on board nearly thirty minutes, when we had to send them away and pursue our voyage.

After leaving Croker Island we had very strong south-east winds for four or five days, and on the morning of the 12th of June remained hove-to under our close-reefed mainsail for six hours. The wind was steady from south-east and generally blew a fresh gale from midnight to noon, when it usually moderated.

Having to keep outside New Year Island and the adjacent shoals, we saw nothing of the coast till the afternoon of the 12th, when we ran into Junction Bay, and came to at 8 P.M. We found this a more considerable opening than the chart had led us to expect. The coast was very like the coast of Adam Bay, densely wooded, and with occasional low red cliffs. Towards the head of the bay, which we could only see indistinctly, the coast seemed fringed with mangroves. The flood-stream set to the south-westward from our anchorage (in 11 feet at low water, and about 1 mile off shore) towards a large creek or river falling into the south side of the bay. We weighed soon after daylight on the 13th, and kept as close along shore as the south-east wind would allow, passing about 10 miles north of the Liverpool River. This part of the country appeared to be thickly wooded, and rising toward the west bank of the Liverpool. From the number of fires along the coast and inland, I should judge this part of the coast to be thickly inhabited. At noon of the 14th of June we sighted Point Dale, and soon afterwards the Wessel Islands. Working through Bowen Straits, and past the English Company's Islands, occupied us till the 16th. These islands, and so much of the mainland as we could see, appeared rather barren, being covered with small scrub. Yet, by the fires we saw on shore, both the above-mentioned groups must be inhabited. Although it was the middle of June, the climate here was quite humid, and

several showers of rain fell each day—the sky being generally overcast and cloudy.

The wind still kept against us, so that we did not anchor in Limmen Bight till the afternoon of the 20th of June, when we came to in $2\frac{1}{2}$ fathoms, about 2 miles north of a small island lying 3 or 4 miles off shore.

After obtaining observations next day, I started with Mr. Guy to explore the various openings in sight along the low mangrove-shore, commencing with the most southern, as being nearest to some isolated white rocky hills. This creek (No. 1) was a mere drain, with mangrove-banks and numerous small branches. We pulled the boat up until she jammed against the banks each side. The bottom of the creek was sand and mud. Leaving the boat, we stepped out into a bare sand-flat, extending to the foot of the northern isolated rocky lump which we had called Mount Young. One creek and all its branches expended itself at high-water spring-tides in flooding the plain across which we walked to Mount Young.

From the summit of Mount Young we had a good view of the surrounding country. To the southward and south-west appeared similar bare rocky hills, shining white in the sun, the more distant forming a range, thinly wooded. Between this range and the sea was a thick scrub. Turning to the northward, the country seemed completely cut up by large creeks running in all directions, one of which could be traced inland to the horizon, and which I at once concluded to be the Limmen Bight River.

The coast to the northward seemed thickly covered with low mangroves for some distance inland, through which ran many small creeks; inside appeared bare sand-flats, extending to the north-west as far as we could see, with narrow slips of grassy land here and there. The whole country in this direction seemed a dead flat, subject to occasional inundations. Our view over the plains was somewhat obscured by thick clouds of sand, driven along by the fierce south-east wind, now blowing almost a gale; so, finding we could do no more with the theodolite, which required to be held in its place by the legs, and came to grief after all, breaking a level, we descended as fast as the rocks would allow us. The natives were firing the country close to the foot of the hill on the land side, but did not trouble us.

Mount Young and the other hills we afterwards visited are all composed entirely of the same kind of quartzose sandstone as the Daly Range on the Adelaide River; and some of the large blocks were so hard as to beat in the back of my tomahawk without my being able to make the least impression. In crossing the flats we noticed numerous tracks of natives, dogs, and emus.

Getting out of No. 1 Creek as quickly as possible, for the sand-

flies were very thick, we sailed round to No. 2 opening, a fine broad creek, nearly half a mile across, and from 2 to 5 fathoms deep, and after ascending it for 8 miles, came to for the night at a place where it seemed to be joined by No. 3 Creek, with an increase of width. The bottom of No. 2 was either mud or brown sand, and the only rocks seen were on some small, stony ridges, from 20 to 40 feet high, and consisted of coarse reddish and white sandstone. These slight elevations were usually covered with gum-scrub, whilst the surrounding country was either bare flooded plains, or grassy, with stunted trees and mangroves, the soil everywhere light and sandy. This description applies not only to the soil round No. 2 Creek, but to all the other land we visited in the bight.

Passing over No. 3 for the present, I shifted the vessel several miles to the north-west on the 24th, and left for No. 4 Creek, getting to the head of its main branch the same night. It ended in a sand-plain at the foot of one of the stony ridges. We went up as far as the boat would go, and came back 3 or 4 miles, where we camped for the night. The bottom of this creek was generally sand; at the upper part the sand was being blown into the creek off a bare dry plain in considerable quantities.

After descending No. 4 Creek I ran along the coast to the north-westward as close as the sand-flat bounding the shore would allow, passing by a low mangrove-covered beach, with several small high-water creeks up which no boat could have gone, and on rounding a point came on No. 5 Creek, which seemed promising, inasmuch as it seemed to me parallel to the coast. I could not enter, however, as it was entirely barred across, being just now low water. So we ran on past a flat, grassy country and sandy beach until we came to Spillen's Creek, which, being practicable, we ran, and made our arrangements for passing the night. Next morning, after the observations requisite for the survey had been taken, we started up Spillen's Creek, which appeared to have an unusual number of branches, the main creek soon became a mere muddy drain, dry at low water, and with iron-stone pebbles mixed with its bottom of mud. The land round where there was an opening in the mangroves was low and sandy, and in places well grassed.

After leaving Spillen's Creek we ran along the coast to the north-west without seeing any opening we could take. Past a mangrove-point with a sandspit in its north-west side inside, which appeared to be a creek, but at this time we could not get near it, the mouth being blocked up by breakers, extending nearly half a mile off shore. The wind was strong from east, so we stood along the coast towards some sand-hills, the first we had seen on this coast. Having effected a landing under the highest

(about 50 feet), I got a good view of the surrounding country from its summit. The view to the south-east was intercepted a mile's distance by tall mangroves, but inland for miles, and round to a w.n.w. bearing, appeared the bare flats I have before mentioned, some dry and with dense clouds of driving sand rushing over them, others partially flooded. There was a small tea-tree scrub in shore of the sand-hills with a salt-swamp between, and, from the presence of a few mimosa-bushes at the foot of the hills, I expect fresh water could be easily obtained here.

The only break to the dead level of the country in sight was a small range some 20 miles distant, in a s.s.w. direction, which I at once called Solitary Range. The coast looked so unpromising that I determined to proceed no further, if I found the latitude to be north of the fifteenth parallel. So the wind having fallen, we found our way into Sandhill Creek, where we passed the night. The mean of my star latitudes on the sandspit coming as near as possible 15° s., and having had the coast for 3 miles north-west of it under my eye, I determined to return to the ship, having had enough for the present of mud and sand-flies. Sandhill Creek proved to run in a regular labyrinth of small mud-drains and mangrove-swamps, dry at low water; and we had some difficulty in getting out of it.

On our getting well out from the land, I observed the schooner under weigh, running towards us. Mr. Guy having run down, thinking we might have some difficulty in getting so far to windward. We hoisted the boat up, and worked up under the lee of Maria Island, where we came to in smooth water. The motion at our former anchorages had been violent, particularly during the ebb tide.

The 28th, 29th, and 30th of June, were spent in surveying Maria Island, wooding, &c. The island may be described as of good elevation, with a very stony soil, and covered with brushwood. Its rocks were coarse sandstone. In most of the flats fresh water had lain not long before; and I have no doubt a strict search would have enabled us to find some at present on the surface. In one place we found an old canoe, and late tracks of eight natives, but saw none.

We left Maria Island on the 1st of July; and on the 3rd, Mr. Guy explored No. 5 Creek, finding it very like all the others, with a muddy and sandy bottom, in some places mixed with iron-stone pebbles. Little now remained to be done, viz., to explore No. 3 Creek, and some of the branches of No. 2, which appeared to run towards the hills. Mr. Guy performed the former service, whilst I proceeded up Oyster Creek, which, after running to the southward 4 miles, and sending off numerous small branches, became a drain about 6 feet wide between mangrove-banks. As

it was high water we managed to force the boat up to nearly the end of its course as a running stream. The country here was a decided improvement on any we had yet seen, though the soil was still very light and sandy, the grass looks very fine, and numerous large paperbark-trees were scattered about, up one of which I got; and, seeing a dry sandy continuation of the creek, followed it up with a man as fast as I could. This dry bed had only small salt-water holes here and there. It ran over a sandy and rocky bed. I knocked up some of the rock, and found it of the same kind as that which forms Mount Young and the other hills. Here and there we came on holes filled with crystalized salt—showing that this part had not been flooded for some time. Most of the sandstone in the bed of the creek was impregnated with iron. We saw numerous native-tracks crossing the bed of the creek. After getting to within half a mile of a stony hill of the same character as Mount Young, we retraced our steps as fast as we could, fearing the falling tide would leave our boat in the present undesirable position for the night. On our way back I picked up a small water-worn quartz pebble, broken into four pieces. This was the only piece of quartz I saw on the mainland, although I observed some among the rocks on Beatrice Islet. We had some difficulty in getting our boat down the creek, the tide having fallen a foot, and managed to stave her, but not badly; the bottom of this creek had in places ironstone and other pebbles mixed with the sand and mud.

We camped for the night at the entrance of Cockatoo Creek, which we ascended next morning; it soon became very narrow and winding, but a rising tide enabled us to pole the boat to within a few hundred yards of its end, which we found in a sand-flat not far from the foot of Mount Young. After again visiting Mounts Young and Hummock, I returned to the boat and got on board the schooner the same evening.

Mr. Guy did not get back till the evening of the 6th, having ascertained the connexion of Nos. 2, 3, and 4 creeks, and that No. 3 was the main outlet of the Limmen Bight River, which he followed up in the boat for 16 miles, where it was still nearly three-quarters of a mile wide. The various creeks he had explored generally ended in sand-flats, and near the end of one he came on a fresh-water hole; the bottoms of these creeks were sand or mud.

Only one native had been seen, though I am sure we were generally watched, and at Spillen's Creek the natives had fires not half a mile from us. On every occasion of going on shore we kept a good look-out for any traces of white men, but saw nothing which could lead us to suppose that either the islands or mainland had been visited.

We had now been absent from Escape Cliffs for more than a month, and as Mr. Guy and myself were satisfied with our exploration so far, and that we could gain no more information without bringing more experience to bear than we felt could be expected, we determined to get back to Adam Bay as fast as we could. Had there been time we should have liked to have examined the coast up to the Roper, and tried to find a navigable entrance to that river. During our stay in the Gulf of Carpentaria the weather was cool and bracing, and everybody on board enjoyed excellent health.

We reached Adam Bay on the 16th of July. On our return, the *Beatrice* was at once employed to take a survey party of over twenty men, their tents, stores, and two months' provisions, up the Adelaide, at the request of the Government Resident. This occupied us till the 28th of July. We landed the party higher up the river than we had before taken the *Beatrice*—the object being to get a good landing-place and camping-place close by. The river-banks here were rather steep and about 10 feet above high-water mark; we were about $1\frac{1}{2}$ mile below the limit of navigation for a vessel of our draught of water; the river was about 40 yards across. We filled up 8 tons of water abreast the camp—baling it up from alongside. It was very muddy for a day or two, but then became remarkably clear; we have been using it ever since, and it has always been quite clear and sweet.

From the 28th of July to the 5th of August we were employed busily wooding, painting, repairing sails, and refitting generally, which was much needed. During this period the natives murdered Alaric Ward, the shepherd, in the middle of the day, and within sight and hearing of the camp. The natives had commenced their depredations two months previously, and had been getting gradually bolder—their last exploit being the thorough sacking of a tent at the Narrows Camp whilst its occupants were in another tent at breakfast.

The murder of Ward caused great consternation at the camp, and delayed our sailing for the Victoria some days. We employed the interval in surveying and sounding out the south channel through Clarence Straits, which we found to be good, though narrow, with deep water.

We left for the south-west coast, with the Government Resident on board, on the 12th of August, the *Julia* being in company. We passed by Port Paterson (having before visited it, being within reach of Escape Cliff at any time by boat), and commenced our exploration in the bay north of Point Blaze. The morning of the 14th opening in a thick fog, the Government Resident left in the *Julia* to explore the coast close in; and in the afternoon we followed round the bay in the *Beatrice*, the coast proving very

low, and fronted with mangroves, and the land inside apparently swampy for 5 or 6 miles inland.

Blaze Point was a low wooded point, with extensive rocky ledges extending more than a mile of shore. As the wind fell light towards sunset, and we began to feel the ebb-stream setting strong to the northward, we came to off Blaze Point. Weighed at daylight, and commenced working down the coast outside the Peron Islands. We only saw the mainland here from a distance; it was very thickly wooded, and gradually rising towards Channel Point, where it attained a height of about 80 feet a short distance inland.

The Peron Islands are sandy, with grassy sandhills along the west coast, and a grassy peak at the north end of the northern island nearly 100 feet high. These islands have extensive reefs and sandbanks off their west sides, running out to a distance of two or three miles, outside which the soundings are very uneven, and bottom rocky.

About sunset we brought up in Anson Bay in $3\frac{1}{2}$ fathoms, about 3 miles north-west of Cliff Head, and found the flood-stream setting E.S.E., and ebb W.N.W., during the night, about one knot per hour. At daylight next morning we observed a large opening in the low land at the east corner of the bay. Weighed, and stood towards it, as it had the appearance of a large river; but, soon getting into 10 feet water had to bear up, and then steered for Channel Point, which we approached to within 3 miles, when the water shoaling to 2 fathoms, we again retraced our track, hauling to the wind and working along shore to the southward, and always getting into shoal water some distance off the east side of the bay, till, at 10 A.M., we came to in 11 feet (low water), Cliff Head bearing S.E. by S. about $2\frac{1}{2}$ miles. The Government Resident then left in the *Julia* to explore the river, which we decided to call "The Daly," should it prove of any size. The ebb-tide meeting the *Julia* in the entrance, they were only able to get up about 4 miles during the afternoon—the tide being very strong, although this was the period of neaps. The river at the *Julia's* farthest was about 500 yards broad, with 4 fathoms water at half ebb, and mangrove-banks and in all respects looking very like the lower reaches of the Adelaide. A long, narrow mangrove-island divided the entrance, the east channel part, which was the deepest. Numerous drift bamboos were lodged among the mangroves, proving the river to come from a long distance inland, and to be a fresh watercourse.

The shore or coast, between Channel Point and the mouth of the Daly River, consisted of a dense forest of mangroves, very high, with small creek-openings here and there. From appearances, I should think that a ship-channel will be discovered, from

the mouth of the Daly running close in to the eastern shore of Anson Bay, and out to the northward of Channel Point, between Peron Islands and the main; although the *Beatrice*, being on the west side of the shoals, could not get into it.

Cliff Head is a line of red cliffs, very like Escape Cliff, running along shore in about a S.S.W. and N.N.E. direction for more than a mile, and projecting very little, if at all; it is about 50 feet high, and the land behind rises to a height of about 120 feet, and then falls gradually; it is thickly wooded. Between Cliff Head and the Daly River the land is low, with a sandy beach. A sand-flat, dry at low water, extended off shore about half a mile, along this part of the coast. Southward of Cliff Head the land became low and apparently swampy, with mangroves inland behind the beach.

At daylight, on the 17th of August, we weighed and ran to the southward and south-westward for 9 miles, about 2 miles off shore, in 3 and 4 fathoms; the coast being very low and thickly wooded, with several high-water creek-openings. We then came to another red cliff-point, more deserving the name of head than the last, but not so high, with a curious flat-topped rock, about half a mile off shore, outside which we passed at a quarter of a mile distance, in 3 fathoms water. We then continued our course round Anson Bay, about $1\frac{1}{2}$ mile off shore, in $2\frac{1}{2}$ and 3 fathoms. The land was very low and thickly wooded. From the number of fires hereabout, I should think this part of the country must be thickly inhabited.

Anson Bay has been described as a fine harbour for shipping, and free from shoals, and we found the water quite smooth and holding-ground good, in this season and during the south-east monsoon; but from the appearance of the beach, I should think the westerly monsoon sent a heavy sea into the bay—a vessel might even then get temporary shelter by anchoring in the west corner, under Cape Ford. The east side of the bay appeared very shoal, and I expect, from December to March, there is a heavy break the whole distance from South Peron Island to Cliff Head.

Cape Ford we found to be a long low slim point, instead of the round flat point it appears on the chart; a ridge of high land runs south from it, along the coast to the southward. For the first 5 or 6 miles south-west of Cape Ford the coast has a most barren look, consisting of high, bare sandhills. Clump Point was low and sandy—a mere long sandspit, with a few low mangroves at its extremity, and a large clump of the same a little distance back; a dangerous covered reef extended some distance south-west of the point.

Between this point and Cape Dombey, the coast was thickly wooded; for a few miles south of Clump Point fronted with low

white sandhills, and then with occasional long lines of low reddish cliffs, under which ran a continuous sandy beach. At the north point of a shallow bay, about 12 miles south of Clump Point, the bottom was rocky and soundings uneven, and a rock or ledge breaking was observed about $1\frac{1}{2}$ mile off shore. We anchored about 8 P.M., a few miles north-west of Cape Dombey, and about half a mile outside a rocky ledge, marked "breaking" on the chart, but at present standing about 5 feet above water, and 200 or 300 yards in diameter. We next morning proceeded to examine a bay between Cape Dombey and Port Keats, in which appeared a large opening on the chart; we found it, however, entirely closed up by a low mangrove-flat, the only opening being a very small stream running into the sea at the east end of a long white cliff, and which had a sand-bar right across it. As we stood along the south shore of the bay, we observed the land become lower and looking swampy as we approached Tree Point, Port Keats, off the mouth of which inlet we anchored for the night.

Next morning, at low water, we saw we were anchored close to some very ugly-looking rocks, which, together with those off Tree Point and Cape Hay, would be very dangerous for large vessels entering. During the afternoon we ran into Port Keats with the sea-breeze, and anchored 5 or 6 miles inside Tree Point. The shores of Port Keats looked exceedingly low and swampy, the only high land visible being Mount Goodwin to the southward; the navigable part of the port is narrow, extensive shoals running off on each side; there is a sandy point and low cliff just inside the west entrance point, but all the rest of the shore is mangrove. The Government Resident proceeded to the head of the port in the *Julia*, and found one or two landing-places; the land, however, was very barren and stony.

We sailed from Port Keats on the morning of the 20th of August, and after rounding the extensive shoals off Cape Hay, steered for Point Pearce, north-west of which we anchored at 8 P.M. The coast between the above points appears nearly straight, with sandhills and cliffs in several places. At our anchorage, north-west of Point Pearce, in 17 fathoms, the ebb-and-flow stream ran north and south more than 3 knots per hour.

At 1 P.M. on the 21st we weighed with the first of the flood, and a light north-west breeze, and steered for the Victoria River. We tried to pass over Mermaid Spit, but the strength of the tide prevented us. At dusk we came to in 8 fathoms, having regulated our course by sextant angles of the distant hills to the eastward, and at low water next morning finding we had made a very lucky hit, being right in mid-channel between the sand-heads. Point Pearce had been out of sight for three hours, and I am afraid the weather is but seldom clear enough to allow of its being

seen from the sand-heads, and used as a leading mark. The dry sands had somewhat shifted and altered their shape since surveyed in 1840. At our anchorage the tidal streams set N.W. by W. and S.E. by E., about 4 knots per hour, and rather too much across the channel to be pleasant. At 1 P.M. on the 23rd we weighed with the first of the flood, and a very light wind from north-east, which gradually hauled round by north to south-west.

The afternoon turned out very dull and misty, and brought out the dangers of the navigation. After passing the north-west end of Quoin Island, the tide seemed determined to set us out of the right channel, so that our proper course being about south, we had to steer west and north-west to keep our position. Here the water became quite calm and as smooth as glass, though a good breeze was blowing aloft, giving us 4 or 5 knots' way through the water. We had been able hitherto to fix our position by angles and bearings to table and fossil hills, and part of McAdam Range, but they now became miraged, and presented a continuous level surface. Quoin Island and the low land on the west side of the river disappeared altogether, even from the masthead, though we knew they were only two or three miles off on either side. Luckily River Peak hove in sight, and the north end of Quoin Island was lifted, so that we saw it a distance of 12 miles. After getting a few shoal casts of $2\frac{1}{2}$ fathoms, we anchored between Observation Island and the mainland in 7 fathoms, and about 1 mile off the latter. Here the flood-stream ran at least 6 knots per hour. The position of Observation Island we never made out either going up or coming down the river; it must be very low.

Next morning we had a fine breeze and clear weather, and could make out all the hill-marks, and the place where the river enters the range, and the mangrove-shore on each side presented a very narrow green line. The flood-tide then running enabled us to work up to Blunder Bay, where we came to in 5 fathoms, just as the tide turned. As the schooner was out of the strength of the tide here, and the anchorage seemed good, she was to stop here in preference to Holdfast Reach, where we might, like the *Beagle*, lose our anchors. At Blunder Bay we were completely surrounded by hills, most of them looking quite bare, and covered with immense rocks; and though some of the hills to the eastward were well wooded, a near approach showed the timber to be small, and the hills all rocks and stones.

Taking advantage of the flood, the Government Resident and myself started up the river the same evening in the *Julia* and gig. We reached Black Point, and brought up for the night at 9 P.M. Several natives made their appearance in Blunder Bay before we started, and as we passed Holdfast Bay the country was on fire on both sides of the river, and the boats were hailed by the natives.

We were prepared to be alarmed at Whirlpool Reach, it being now spring-tides, but being accustomed to the narrows of the Adelaide River, to us Whirlpool Reach seemed hardly to deserve its name, and we felt rather disappointed.

Next morning we proceeded up the river with a fresh south-east wind, and made good progress. The scenery was certainly very striking, but the rugged, barren ridges did not look well for a settlement. We saw the gouty-stem trees for the first time when rounding the high rocky point north of Shoal Reach, in which reach the *Julia* had her first little difficulty with some shoals, but soon got clear with the rising tide. As we advanced along the next reach, which trended E.N.E., the country seemed to improve; the sandstone ridges on the north side, though very broken and precipitous, were clothed with grass, and the south side of the river was low grassy land, gradually rising. We landed up a small creek on this side and walked about half a mile inland. The country was covered with small timber and well grassed. This being the dry season the grass was all withered, but looked of a finer quality than that on the Adelaide.

We passed Mosquito Flat at high water and so got over the shoals, but with barely enough water for the *Julia*; and after getting a little bothered among the banks off the mouth of the large creek, east of Curiosity Peak, we came to in 2 fathoms, close to a detached hill, south-west of the Dome.

The cliff on the chart close to our anchorage is merely a perpendicular earthy bank, about 6 feet above high water. During the afternoon I went up the adjacent hill, about 600 feet high; it is long, very narrow, and with high cliffs surrounding its summit. I had a good view over Mosquito Flat and the Whirlwind Plains; the former was a mere mangrove-swamp, with some grassy land inside toward the foot of the hills; several creeks intersected the flat and drained it, and the dry part had very evident water-marks across the surface. A rise of a few feet only would send a stream across the flat, from the Victoria; former marks showing that the water would come in between Dome and the hill we were on.

Turning toward Whirlwind Plains, the part nearest us seemed very little above high-water mark, but the country having been lately burned, the grass looked green and pleasant; beyond 3 or 4 miles the plains presented the appearance of a dense scrub, which appeared to extend to the south-east as far as the next range. The hill on which we were was nearly devoid of vegetation, except on its summit, which was flat, and at each end of sufficient width to grow some small trees and a few tufts of grass; just under the perpendicular cliffs round the summit were some tall fan-palms. The flood tide seemed to have some difficulty in getting past the shoals off Mosquito Flat, for we did not get it till

2 P.M. next day, when we started, and passing along the foot of sea range, opened out on the long reach through which the Whirlwind Plains run, down which we proceeded about 3 miles, when we came to. The plain at the foot of the sea range was low, and covered with coarse grass very like that on the lower plains of the Adelaide; on the opposite side of the river was a long earthy or sand cliff crowned with an open scrub of small white-stemmed gum-trees.

The general appearance of the Whirlwind Plains was very different from what I had expected; instead of open prairie-land, covered with grass and with hardly a tree in sight, wherever I landed, which I did repeatedly, I found myself in what I should term an open grassy forest; the timber of which it was composed being almost invariably the peppermint-gum common in South Australia; the greatest height which it attained here seemed about 40 feet. The soil was of a deep brown colour and sandy nature, and getting much lighter in colour beneath the surface. The above description does not apply to more than half a mile inland from the river on either side, as I did not go beyond that distance at any time, and the wood was too thick to see more than 200 yards' distance.

The river, in the long reach, was about 300 yards wide, and with scarcely any tidal stream, and about 2 feet rise. The east side was generally clifty, showing the nature of the soil very well, and the west bank was fringed with a narrow, even wall of mangrove-scrub about 15 feet high. Several very large gouty-stem trees grew on the bank. On cutting into one with an axe, I found the interior very soft and juicy, or spongy, and quite white. I got a very good drink by sucking and chewing a large piece. It tasted like the juice of a ripe cocoa-nut. We obtained some of the fruit, which was the size of an emu's egg, with a green skin like that of a quince, but quite hard, and about a tenth of an inch thick, inside which was a solid white spongy mass, quite dry and full of seeds—this had a sweetish taste. I have no doubt this fruit is very good if gathered when just ripe; but those we got were evidently last year's, all the trees being without a vestige of foliage. Stokes says too, they were in blossom in November. The plains near the river seem much cut up by watercourses in all directions.

Nearly opposite the cone "White Cliff" on Stokes's chart of the river, is a pebbly point behind which we came on a creek, which, from the trees growing in its bed, must run with fresh water in the rainy season—some of the men found a little. The white cliff opposite appears to have obtained its name from the grass growing down its face, which at this time of year would appear quite white by moonlight; but where it had been burnt off this cliff was exactly like the others; several pieces of lime-

stone were picked up hereabout. Sandy Island has a long pebbly spit off its south end, on which several of the men picked up some very pretty pieces of stone. As we advanced up the river the banks seemed to get higher, and, for some miles before the Whirlwind Plains cease, were nearly 50 feet high.

On the 26th we left Whirlwind Plains and again were pulling along between hills; they were very stony, but covered with grass and wooded with peppermint. At 8 P.M., whilst towing the *Julia*, we both came suddenly on a ridge of rocks, and, after getting clear, came to for the night; we were about 2 miles below Steep Head. On the morning of the 27th I landed on the south bank, and was surprised to find the watercourses full of limestone lumps, and afterwards to see the soil covered with small pieces of the same. I walked across the plain to the foot of the hills—dark sandy soil, with a variety of stones, including some large pieces of red jasper; the grass was thick, and, apparently, of very good quality. The country had not the cracked appearance of the Adelaide, but the rain seemed to collect in watercourses and drain off into the river.

After breakfast we succeeded in getting the *Julia* about half a mile further up, when she again struck, so, seeing it would be useless to attempt to get her any higher, the Government Resident came into the gig, and, in company with the *Julia's* dingy, started for as far up as we could get.

Steep Head soon came in sight, its black face composed of laminated sandstone placed in horizontal strata. After landing to examine it, we proceeded for a short distance to where we came to a series of rocky bars extending nearly half a mile, over which we dragged the boat, and came into a fine deep reach, where the water was only slightly brackish, and a little rain higher up would make quite fresh. We pulled on through a reach about 100 yards broad, and looking like some of the upper reaches of the Adelaide, but wider. We pulled past an island, which leaves only a very narrow channel, just wide enough for the oars on its north side, and soon afterwards had to stop at what we supposed to be Palm Island—the river here coming to an abrupt termination as a continuous stream. The water here was quite fresh, so we filled all our breakers, the dingy also filling those she had brought from the *Julia*. The bar across the river here was composed of shingle, some of the stones being of large size. A number of trees grew in the bed of the river, mostly tea-trees, some of large size, also plenty of palms and small scrub. Most of the tea-trees, though of large size, were inclined at an angle of 45° with the water, in the direction of the stream, showing a powerful rush of water at certain times. I went on to the next reach, separated from the lower water by a bar about 30 yards across, composed of

rock and shingle, and had a quiet bathe some distance up, though not without some fear of alligators, as we had seen one just outside. The last reach reminded us very much of the Adelaide, having the same kind of willow-like paperbark or tea trees overhanging the stream; the palms and reeds also seemed to be exactly the same. We saw, however, no bamboos in the whole course of the Victoria to this point; the land here, too, was much cut up by watercourses; the hills came close to the river and were very high and remarkable in form, steep and rocky, but covered with grass.

We returned to the *Julia* in the evening after a little difficulty in getting the boat over the rocky bars. Some of the men thought the water had fallen a few inches, but I could see no difference, except that the boat was deeper by 30 gallons of water. The stream was running down over the stones at 9 A.M., and the same at 4 P.M.

On the morning of the 28th we started down the river with a fresh south-east breeze, and this being the first fair wind we had had, we made good progress. Nothing of interest occurred until 2 P.M., when on entering the Mosquito Flat Reach, and apparently in the centre of the channel, the *Julia* went on shore. The river had evidently been shoaling up since Captain Stokes' survey, as he had one fathom marked at low water, where we walked about quite dry at half tide; in fact, before we left, it was possible to walk right across the Victoria here at half tide from Mosquito Flat to within about 100 feet of the south shore without getting wet feet—myself and many others did it. Close to the south shore, however, existed a narrow channel of from 3 to 5 feet water, at low-water neaps. This, however, is the channel of the Wickham Creek, and at low-water springs can have no connection with the Victoria Proper. After we left her, each tide got lower, until the flood never reached her at all, and she was left high and dry during a whole day; showing that only the spring-tides reach above Mosquito Flat. On our arrival on board, on the 31st, with the Government Resident, I sent Mr. Guy up to the *Julia* with a good supply of fresh water, and was very glad to see both boats back on the evening of the 3rd of September. A stiff sea-breeze had sent up a high tide the previous day, and enabled the *Julia* to float off.

During the absence of the boats, the schooner had experienced very hot dry winds from south-east, causing leaky decks, &c.; in fact, the same winds that blew cool to us up the river, having to come over many miles of hot burning naked rocks, became heated to almost the temperature of an Adelaide hot wind. Two or three cases of fever had occurred on board, and my boat's crew and self suffered from sore eyes, which soon got well when we got outside. We had been able to get a plentiful supply of very good firewood

from Entrance Island—a sort of resinous pine, with hard sound wood of a teak colour. This leads me to remark that the mangroves of the Victoria River are mere brush generally, not growing to a height of over 6 feet, and of no use whatever as firewood. The writer of the ‘Handbook of the Northern Territory’ must have been thinking of the Adelaide River, where the mangroves grow tall and straight like pines, and to a height of 80 and 100 feet without a branch, when he mentions the mangrove-forests at the mouth of the Victoria; the fact being that the said forests are hardly visible from a ship’s deck at 4 miles’ distance. I have generally found that sand kills off the mangrove-trees altogether, and from its mouth to Palm Island the banks of the Victoria are sandy.

As a navigable river, I consider the Adelaide to be far superior to the Victoria. In the former, a vessel of the size and draught of the *Beatrice* can ascend nearly 80 miles, into fresh water, with perfect safety. In the Victoria, the same vessel could not get much farther than Holdfast Bay, without great risk; and Mosquito Flat, at this season, is not passable by large boats except at spring-tides. There is a great difference in the soil of the two rivers, the Adelaide being clayey and muddy, and the Victoria sandy. I do not pretend to have any idea as to which is the best for this climate, but the land about the Victoria certainly looks the best, that is, above Mosquito Flat. I notice one great difference: whereas the water which falls on the plains of the Adelaide appears to remain stagnant, until dried up by the sun or filtered through the soil, the rainfalls on the Whirlwind Plains, and above them, seems to run at once off in violent torrents—which cause the numerous small but deep watercourses I have spoken of before.

On the morning of the 4th of September, we ran from Blunder Bay, with a fair wind, in company with the *Julia*, and got as far as the point off Forsyth Creek. The same evening, the tide having risen 22 feet, the *Julia* left us to make the best of her way back to Escape Cliff, the Government Resident going on with us to Timor.

XVII.—*Notes on the West Coast of Madagascar.* By Captain J. C. WILSON, R.N.

THE Island of Madagascar is little known except through the excellent works written by the Rev. Mr. Ellis; and in those works we find but slight mention of the western coast, which I purpose to form the subject of this paper.

From the geographical position of the island, lying as it does across the trade-winds, the climate and general features of the east and west sides materially differ. The west is peopled by the Sacalava tribes, who may be looked upon as quite as distinct a